

AD 675194

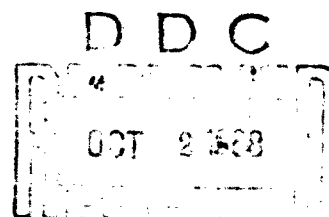
TRANSLATION NO. 2154

DATE: 10 April 1968

DDC AVAILABILITY NOTICE

Qualified requestors may obtain copies of this document from DDC.

This publication has been translated from the open literature and is available to the general public. Non-DOD agencies may purchase this publication from the Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Springfield, Va.



DEPARTMENT OF THE ARMY  
Fort Detrick  
Frederick, Maryland

Reproduced by the  
CLEARINGHOUSE  
for Federal Scientific & Technical  
Information Springfield Va 22151

This document is approved  
for public release and sale; its  
distribution is unlimited

20050203019

Best Available Copy

## BACTERIAL DISEASES OF CULTIVATED PLANTS

W36/504768/314607

Pages 230-235, V.25, 1964

Trudy vses. Inst. Zashch. Rast.

L.N. Bushkova

About 80 bacteria species which induce diseases in 67 varieties of cultivated plants are now known in the Soviet Union. The bacterial diseases cause great losses to the national economy, adversely affect crop quality and reduce yield. As yet, however, we have no detailed information on the extent of their prevalence in different areas. This is partly because of diagnostic difficulties. For that reason the data cited below were predominantly obtained in 1961, and relate only to separate, most important diseases.

Grain bacterial diseases are usually widespread, but only to a slight degree (1-2 points on the scale).

SPOT BACTERIOSIS (*Bacillus cerealinum* Gentner) affects barley in Kazakh SSR (to 91% of the plants), wheat and barley in Krasnoyarsk kray (to 64% and 80% of the plants respectively), and wheat in Altay kray (to 6%).

BLACK BARLEY BACTERIOSIS (*Xanthomonas translucens* var. *hordei* Hach.) has frequently been found on almost all plants in Altay kray.

BASAL BACTERIOSIS (*Pseudomonas atrofaciens* McCull) was noted on wheat and, rarely, on rye in Kuibyshev oblast.

BROWN BACTERIOSIS [*Pseudomonas coronaficiens* (Elliot) Stapp] affected oats in Altay (100%) and Krasnoyarsk (from 20-40%) krais, Novgorod (16%), Cherkassk (13%), and other oblasts.

STRIPE BACTERIOSIS [*Pseudomonas panic* (Elliot) Stapp] was found on millet in Kuibyshev oblast (19-92%) Krasnoyarsk kray, and some fields in other regions.

BACTERIAL CORN LEAF SPOT (*Pseudomonas holci* Kendrick) was recorded in Saratov oblast (to 100%), Dniepropetrovsk oblast (to 90%) and in Georgia (to 22%).

SPADIX BACTERIOSIS (*Bacillus mesentericus vulgaris* Flugge) was found in Povolzh'ye, Ukraine, Northern Caucasus, Georgia and other regions.

Information in greater detail is provided in the article by F.Ya. Nemliyenko and G.V. Grizenko (page 146).

The bacterial diseases of technical crops acquired great importance with the cultivation of cotton, flax, potatoes, sugar beet, tomatoes, and tobacco.

COTTON GUMMOSIS [*Xanthomonas malvacearum* (Smith) Dowson] was found in all zones where cotton is cultivated; it was particularly widespread in the southern regions.

A severe outbreak of the disease was noted in many fields of Kirgiz SSR, Turkmen SSR, and Tadzhik SSR. An increase in the number of plants affected by the disease occurred in Osh oblast in 1964 (Table 1).

Table 1

Maximal degree of cotton gummosis affection in Osh oblast in 1964 (in %)

Point of Experiment	form of disease manifestation			
	cotyledonous	foliated	stem	boll
Kara-Su	----	10.0	6.5	5.5
Osh	50.0	13.0	8.5	6.0

The affection is probably due to the fact that guzaya (cotton stems and bolls) is plowed under during the fall plowing.

The number of diseased plants in Chradzhou, Kunya-Urgenche, and several other regions of Turkmenia varied between 32% and 80%, particularly the S-4727 cotton variety, while in Khodzentskiy and former

Kurgan-Tyublinskiy rayons of Tadzhikistan -- between 15-25%.

In Uzbekistan (Tashkent and Bukhara oblasts) from 7-10% of the plants were affected by the cotyledonous form of the disease. On the other hand, the maximal number of plants affected by the cotyledonous form of the disease in the Maryysk and Tashauzsk rayons of Turkmenia was not over 3-5%; only single leaves and stems were affected.

Marked disease development was also noted in some regions of the Transcaucasus zone. Thus, gummosis developed seriously in Oktemberyanskiy rayon (to 43%) of Armenia SSR. Treating the seed with TKhFM (copper trichlorophenolate) (centralized at the cotton purifying plants) helped control the disease in Azerbaydzhan. Even here, however, the workers at Agdamsk and Kazakhsk oberrvation points recorded cases of intense disease manifestation: foliated form -- up to 7% strongly affected, 14% moderately affected, 29% mildly affected; stem form -- 3.3% strongly affected, 4.8% moderately affected, 6.8% mildly affected; boll form -- 3.3% strongly affected, 4.5% moderately affected, 12.5% mildly affected.

FLAX BACTERIOSIS (*Clostridium macerans* Schardinger) is found everywhere, particularly on dark-colored, slightly swampy, virgin and long-plowed lime soils with insufficient boron content.

In addition to the data cited in Table 2, considerable flax bacteriosis was recorded in Pskov (to 100% of the plants), Kalinin, Yaroslavl', Kostroma, and Gornel oblasts (to 75%).

The application of plain superphosphate in the absence of boron fertilizers contributed to disease development. Up to 20% of the plants were infected in Ivanovo oblast (Puchezhskiy rayon), while in some areas up to 50% of the plants were affected, mainly the L-1120 variety (to 80%). The young flax shoots were very strongly affected in Rovno oblast (to 21%).

BACTERIAL WILDLIFE OF TOBACO (*Pseudomonas tabacum* Wolf and Foster) was found in the central belt and southern regions of the European part of the USSR. The number of diseased plants frequently averaged 20-30% (Mordovian SSR, Severo-Osetinskaya ASSR, Azerbaydzhan and Ar unian SSR, and Razyansk and Lipetsk oblasts). Most diseased plants

were in Tambov oblast (100%); less in the Crimean (1-2%) and Poltava (2-3% oblasts.

Table 2  
Bacterial flax disease in 1964

Республика, область	Процент пораженных растений	Процент зараженных растений из числа обследованных	Республика, область	Процент пораженных растений	Процент зараженных растений из числа обследованных
1 Московская обл. . . . .	d До 10	86	5 Минская обл. . . . .	d До 7	73
2 Витебская обл. . . . .	8	50	6 Латвийская ССР	e 12 до 15	—
3 Новгородская обл. . . . .	3	14	7 Марийская АССР	1	—
4 Ивановская обл. . . . .	e 3 до 10	—			

Legend: a- republic, oblast 1-Moscow oblast  
b- percentage of affected plants 2-Vitebsk oblast  
c- percentage of investigated area affected 3-Novgorod oblast  
d- to 4-Ivanovo oblast  
e- from 5-Minsk oblast  
6-Latvian SSR  
7-Mariyskaya ASSR

POTATO BLACKLEG [*Erwinia phytophthora* (Apfel) Bergey et al] is found everywhere. Maximal manifestations of the disease were noted in Udmurtskaya ASSR, Kazakh SSR, and Belorussian SSR (20-40%), and in Arkhangel'sk and Tambov oblasts; to a milder degree (5-10%) in Moscow, Poltava, Perm, Kuibyshev, Chita oblasts, and Yakutsk ASSR; to a lesser degree (to 5%) in other regions of the European part of the USSR where potatoes are cultivated.

BACTERIAL OR HOLE BEET LEAF SPOT (*Bacillus mycolides* Flugge; *Bacillus mesentericus vulgatus* Flugge; *Bacillus betae* nov. sp. Koszura) was found on sugar beet leaves in Mordovian ASSR, Gor'kiy, L'vov, Chernigov (to 29%), and Tver' (to 47%) oblasts. The disease was only mildly manifested in the other regions where beet is cultivated, with 1-4% of the plants affected.

Bacterial diseases of vegetable and melon crops in most cases were noted on tomatoes, cucumbers, cabbage, watermelons and other plants. Large areas were infected by some of the diseases. Data concerning each disease is cited below.

TOP ROT OF TOMATOS (*Bacterium lycopersicum* Groenow) apparently is found everywhere. Considerable affection of fruit (to 20-40%) has been noted in Zhitomir,

Pavlodar, Poltava, Saratov, Odessa, Kemerovo, Jurgansk, and Omsk oblasts, and Mordovia ASSR and Buryat ASSR.

In other regions where tomatoes are cultivated, milder cases of the affection were found.

There is a considerable number of sources of infection, and outbreaks of the disease may occur with new force if the necessary prevention measures are not applied. Such an outbreak occurred in Odessa oblast where in 1962 -- 0.3%, in 1963 -- 2.3%, and in 1964 -- 23% of the fruit was affected.

TOMATO BACTERIAL SPOT [*Xanthomonas vescatoria* (Dodre) Dowson] was widely distributed, particularly in Moldavia, Northern Caucasus, and Kazakh SSR (100% of the plants and 16% of the fruit were affected); widespread in the steppe zones, in Siberia, and the Far East (30-70% of the plants and 11-16% of the fruit), and to a lesser degree in the Southern Povolzh'ye region.

WATER (soft) TOMATO ROT (*Erwinia aroidae* Town) was rarely found, and only in insignificant quantities in Dniepropetrovsk and Kuibyshev oblasts and in Turkmenian SSR.

BACTERIAL TOMATO CANKER [*Corinebacterium michiganense* (Smith) Jensen] was found only to a mild degree in some areas of the forest-steppe (Bryansk oblast) and steppe zones, and in Western Siberia.

CUCUMBER BACTERIOSIS [*Pseudomonas lachrymans* (Smith et Bryan) Ferraris] is widely distributed and strongly affects plants (40-100%) and fruit (10-17%) in the central belt and southern regions of the European part of the USSR, Siberia and the Far East, causing crop losses of up to 20%.

Only a mild outbreak (up to 5% of the plants) was recorded in the nonchernozem zone and Northern Volga region.

VASCULAR BACTERIOSIS (BLACK ROT) OF CABBAGE [*Xanthomonas campestris* (Pammel) Dowson] was found prevalently in Ukraine, Kazakhstan, Altay, Far East and some oblasts where meteorological conditions were favorable to the development of the disease.

Thus, cases of strong affection were recorded in Moscow, Lipetsk, Volgograd, Kuibyshev, and Orenburg oblasts (35-50%).

Maximal degree outbreaks were recorded in Sumy and Voronezh oblasts (to 85-90%), with the loss of the entire crop in the Semiluksk rayon of Voronezh oblast.

About 200 centners of the crop per hectare were lost in Kuibyshev oblast; losses of up to 18,000 rubles were suffered by the kolkhoz "Volgar."

In Zaporozh'ye oblast 35 centners of the crop per hectare were lost as a result of black rot.

A moderate and mild outbreak of the disease (5-20%) occurred in the forest-steppe and steppe zones, in Kazakh SSR, Chuvash ASSR, and Tatar ASSR.

The varieties of cabbage most affected were Slava, Gribovskaya, Zimovka, and Podarok; the Lebezhskaya and Kievskaya varieties were only mildly affected; the Biryuchekutskaya and Likurishka varieties were not affected.

SLIMY BACTERIOSIS OF CABBAGE (Bacterial soft rot) *Erwinia carotovora* (Jones) Holland u *E. aroideae* Townsend was only mildly developed in Kiev, Zaporozh'ye, Kherson, Volgograd oblasts, Krasnoyarsk kray, and Kazakh SSR. Up to 20% diseased plants were counted in Donetsk oblast.

Manifestations of the disease were particularly severe in Khabarovsk and Primorskiy krays (to 35-60%); foci developed in Moscow oblast (to 100%).

TOXIC BACTERIOSIS OF WATERMELONS (*Bacterium coli* Lehm et Neum) was recorded in Donetsk (51% of the plants and 16% of the fruit affected) and Saratov (25% of the fruit) oblasts, mainly the young plants 2 to 10 cm in diameter. Cases of human infection were reported in Saratov oblast. About 139 tons of watermelon were found unsuitable for consumption.

Bacterial diseases of legumes have not yet been adequately studied. Scattered and occasional reports of bacterioses of peas, beans, red bacteriosis of legumes, blackleg, bacterial wilt, root canker, and others make it difficult to correlate the data received from the observation points of the Prognostic service.

Information regarding the distribution of bac-

terioses of peas, legumes, and beans only is presented below.\*

BEAN BACTERIOSIS is found everywhere. The following microorganism could have been the pathogens of the disease: *Xanthomonas phaseoli* (E. Smith) Dowson; *Xanthomonas phaseoli* var. *fuscans* (Burkholder); *Corynebacterium flaccumfaciens* (Hedges) Dowson; *Pseudomonas phaseolicola* (Burkh.). The symptoms of the diseases caused by these species of bacteria are very similar.

All of the bean plants in Idzhevanskiy rayon, Armenian SSR were affected by the diseases: 94% with an intensity of point one, and 6% with an intensity of point two on the scale. Up to 15% diseased plants were discovered in many sections of Mordovian ASSR.

BACTERIOSIS OF LEGUMES (causative agent unknown) was noted in Leningrad, Gor'kiy, and Novosibirsk oblasts (80%) and Tyumen' oblast (3%).

BACTERIOSIS OF PEAS (*Pseudomonas pisi* Sackett) is usually prevalent in Ukraine, the central oblasts of the chernozem belt, Kazakhstan, and Siberia. In 1964 the disease was noted in Krasnoyarsk kray only.

Bacterioses of fruit plants besides being locally affected frequently acquire a chronic form, finally causing the wilting of twigs and trees. Among these are some quarantine affections.

The species composition of the pathogens of the bacterioses on the basis of the data provided by the Service has not as yet been established; therefore, only scattered data concerning the best known diseases found almost everywhere are included below.

---

\*Symptoms of the diseases and methods of calculation are described in Metodicheskikh Ukazaniyakh po Raspoznavaniyu i Uchetu Vreditel'ey i Bolezney Gorokha, Kormovykh Bobov i Otlenke Effektivnosti Bor'by s Nimi (Methodical Instructions for the Identification and Calculation of Pests and Diseases Affecting Peas and Legumes, and the Evaluation of the Efficacy of their Control), Sel'khozizdat, 1962.



BACTERIAL BLIGHT OF PEACH LEAVES [*Xanthomonas pruni* (Smith) Dowson] is found in highly different areas where fruit trees are cultivated (Siberia, Caucasus, Central Asia).

In 1964, Ukrainian peach trees lost their leaves en masse as a result of a severe disease outbreak.

BACTERIOSIS OF THE WALNUT TREE FRUIT (Bacterial blight) [*Xanthomonas Juglandis* (Pierce) Dowson] was discovered in Odessa oblast. Dark impressed spots on the fruit apparently caused some loss in weight of the kernels.

ROOT CANKER OF FRUIT TREES (*Pseudomonas tumefaciens* Smith et Towns.) is found everywhere to some degree on mature trees.

Diseased two year old apple trees were recorded in Luga rayon of Leningrad oblast.

BACTERIAL WILT OF APRICOTS AND MAZARDS (*Bacterium armeniacum* Mirzabekjan nov. sp.) was found in Crimean oblast on five to ten year old plants, causing first the wilting of twigs and then of the whole tree. Information regarding the frequency with which the disease appears in this and other regions is lacking.

BACTERIAL CANKER OF AMGDALACEAE (*Pseudomonas cerasae* Griffin) was found in Zaporozh'ye oblast on apricot, prune and, particularly, mazard trees. In a number of gardens canker caused the death of 70% of the trees.

Reports of fruit tree blight were received from Odessa oblast; 3% of the 25 to 30 year old trees on the garden sections of the kolkhoz imeni Michurin were affected. In Donetsk oblast 50% of the young trees dried up, apparently from the same disease. The pathogen which causes the disease has not been identified. Therefore, only after the pathogen is identified can it be positively stated that fruit tree blight occurs in the USSR.